CHINA OpenStack Days

CHINA OpenStack Days | IT大咖说 知识分享平台

Topic: CEPH4NFV

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OPNFV

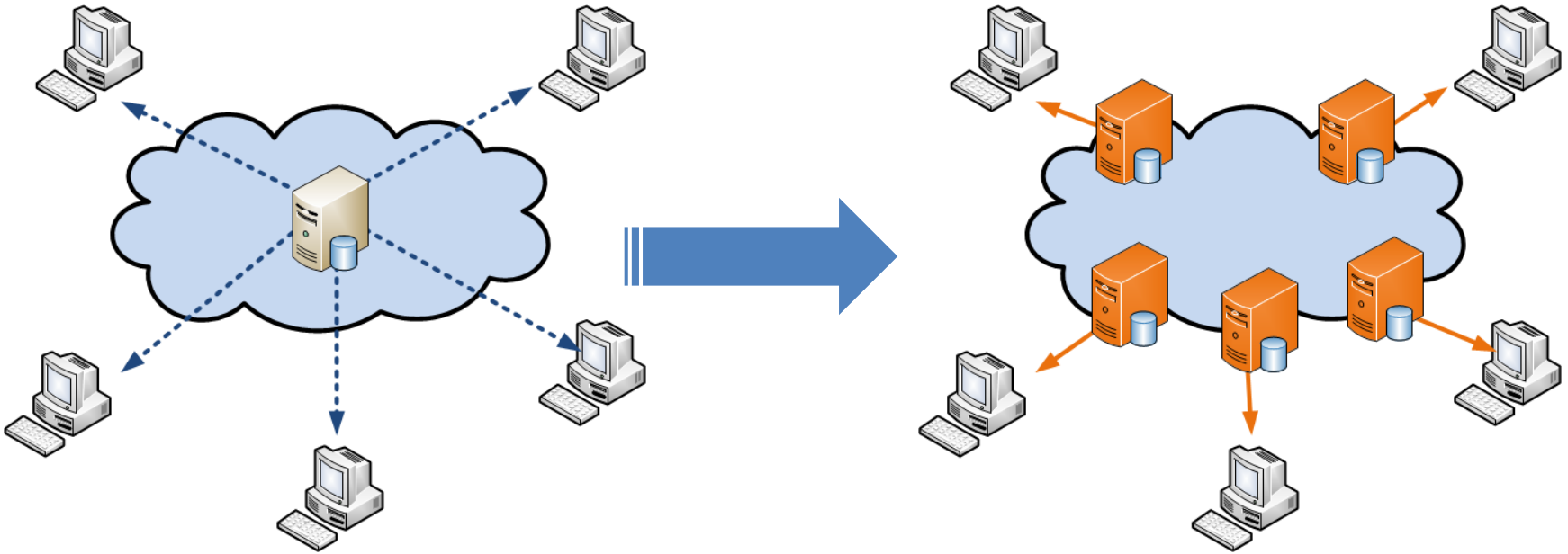
- OPNFV is a carrier-grade, integrated, open source platform to accelerate the introduction of new NFV products and services.
- NFV use cases

Use Case	VNF Types
Enterprise Customer Premise Equipment	VPN, WAN optimization, Intrusion Detection, NAT, Firewall, VOIP
Customer Premise Equipment	Cable television set-top boxes, DSL or other broadband Internet routers, VoIP base stations, telephone handsets
Mobile Core	Signaling Gateway, Packet Data Network Gateway, Mobility Management Entity and Home Subscriber Server
Sgi/Gi-LAN	Firewalls, NAT, Deep Packet Inspection (DPI) nodes, video and TCP optimizers
Radio Access Network	GSM, GERAN, UTRAN, E-UTRAN/LTE

Content Delivery Network

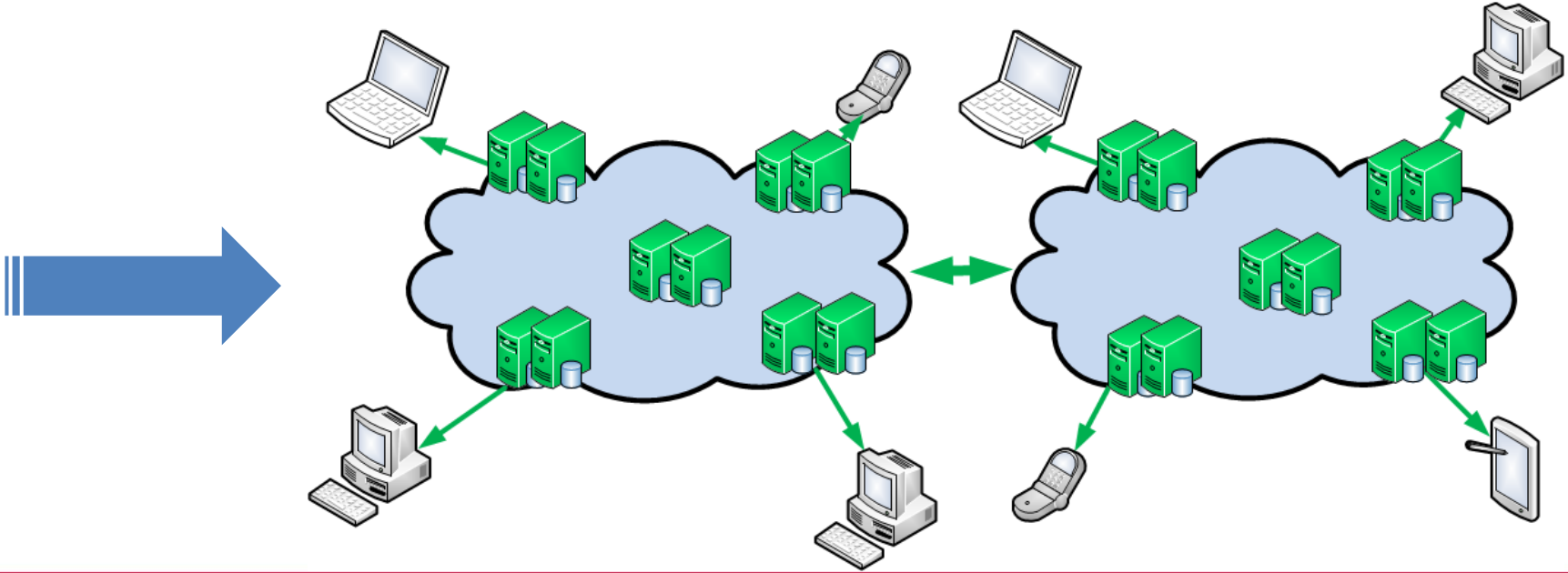
- CDN is a globally distributed network for proxy servers deployed in multiple data centers to serve content to end-users with high-availability and high performance.
  - Video streaming
  - Software downloads
  - Web and mobile content acceleration
  - Licensed/managed CDN
  - Transparent caching
  - Services to measure CDN performance, load balancing, multi-CDN switching and analytics and cloud intelligence.

First Transition of CDN from Centralized to Distributed

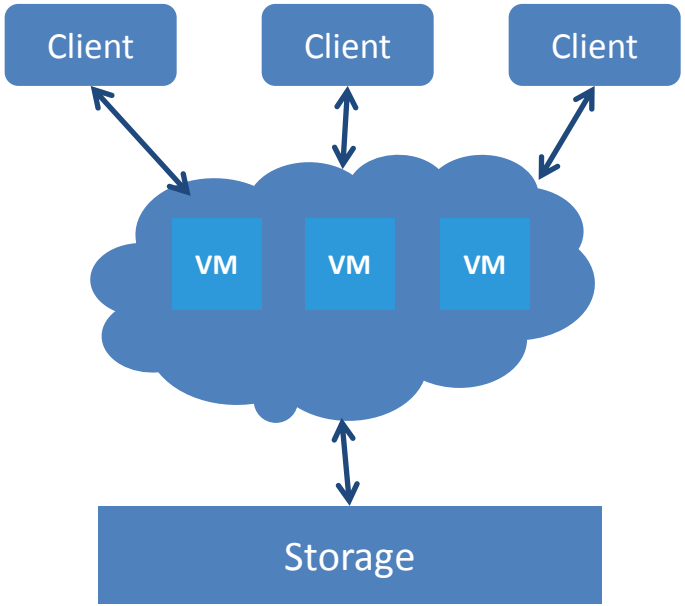


Second Transition of CDN with Virtualization and Cloud

Virtualization empowers elasticity and programmability.



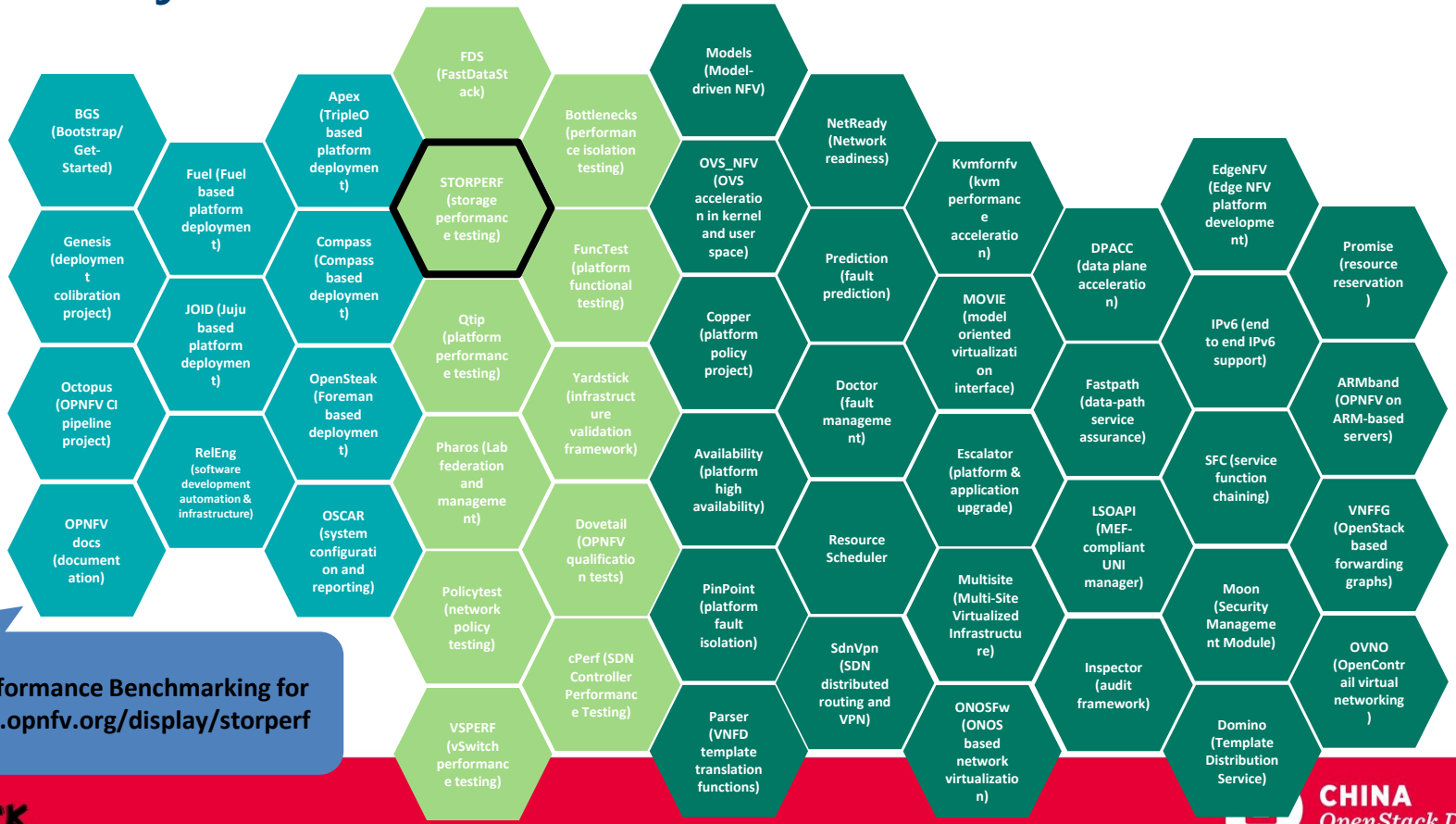
Virtual Content Delivery Networks



OPNFV Requirements for Storage

- Faster read and write data, high performance hot data storage system
  - Text, image transferring in instant messaging
  - Video uploading, transcoding, downloading in video streaming
- Mass cold data storage and tiering for various categories
- Fast launch of VM clusters for scalability
- High availability
- Service assurance
- Storage orchestration and management

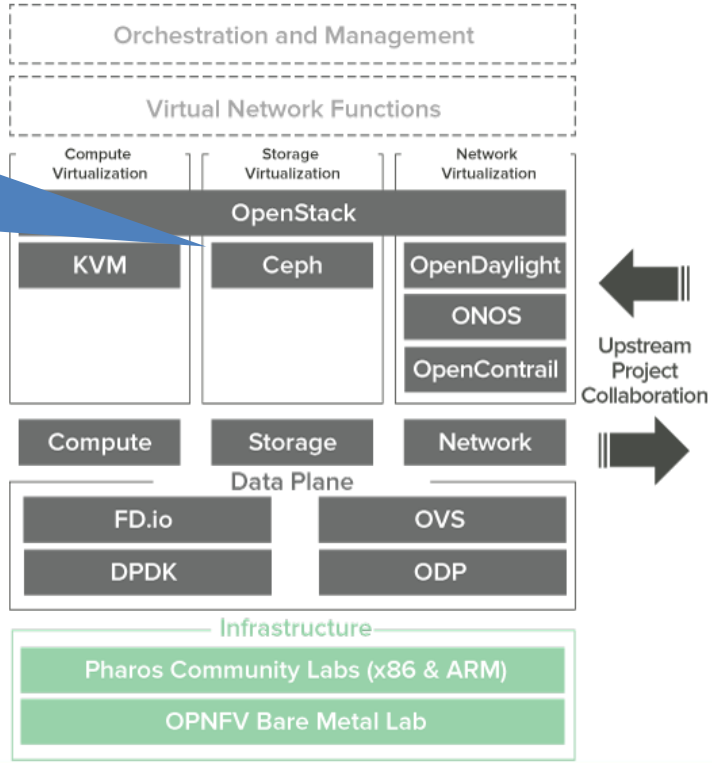
OPNFV Projects



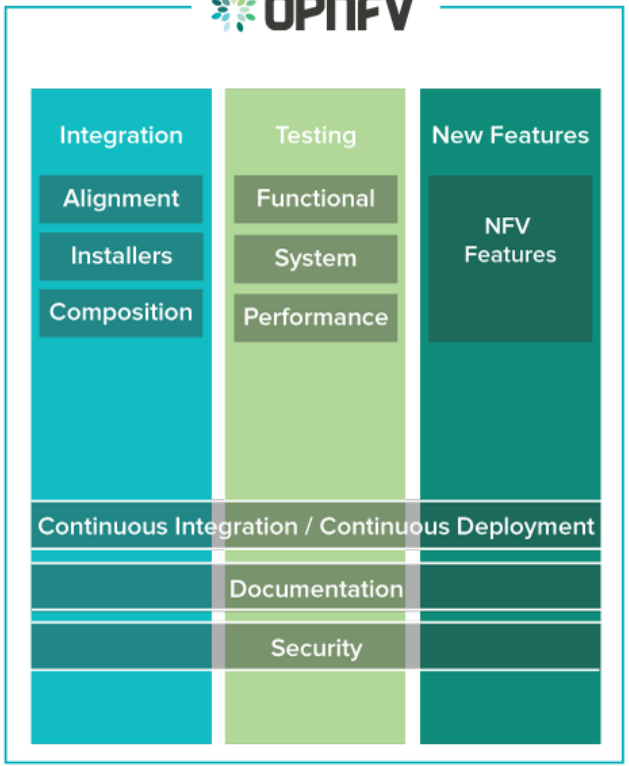
ONLY Storage Performance Benchmarking for NFVI: https://wiki.opnfv.org/display/storperf

OPNFV Danube Release

Ceph is by default recommended in the reference design since Arno. But not in the project officially.

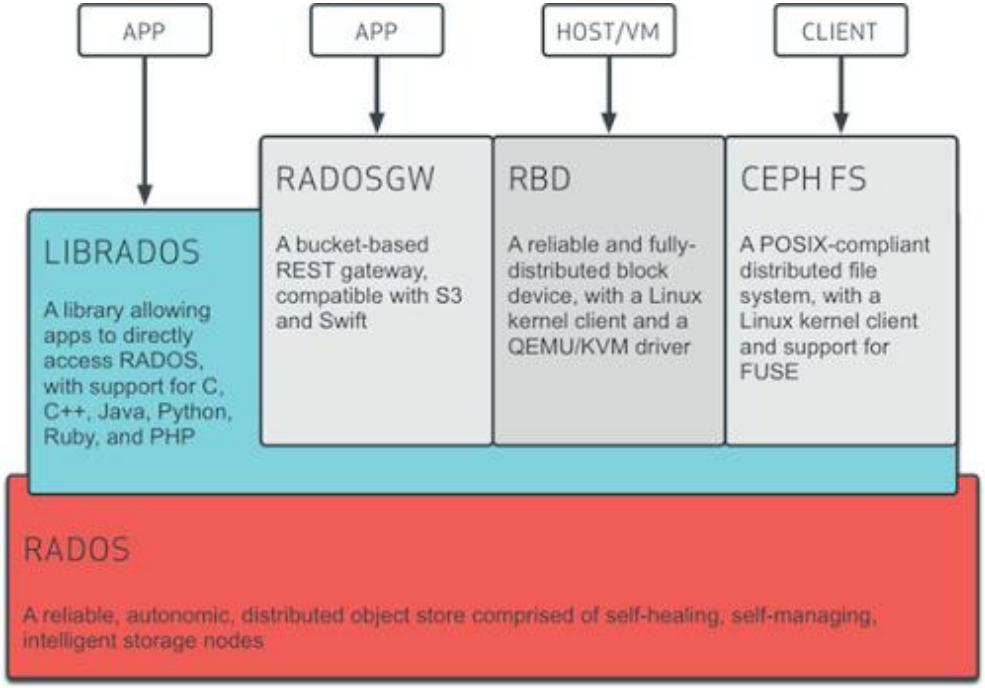


Upstream Project Collaboration

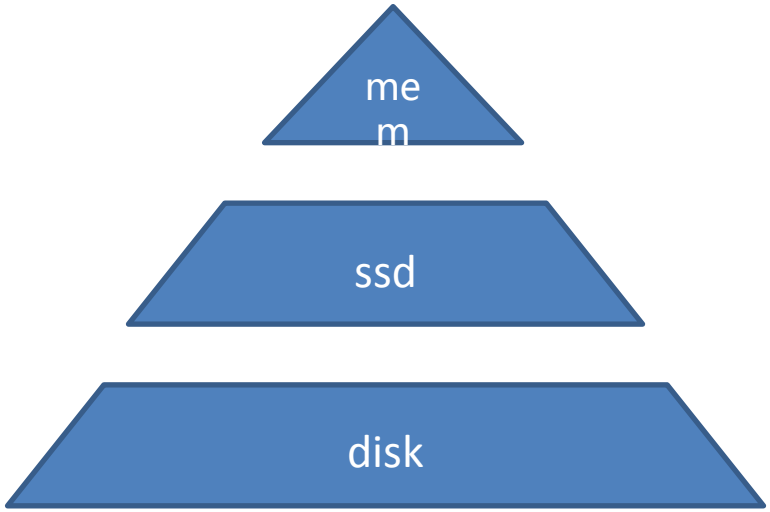


Why Ceph?

- Open-source, object-based scale-ou storage
- All-In-One: Object, Block and File in single unified storage cluster
- Highly durable, available – replicatio erasure coding
- Runs on economical commodity hardware
- 10 years of hardening, vibrant community

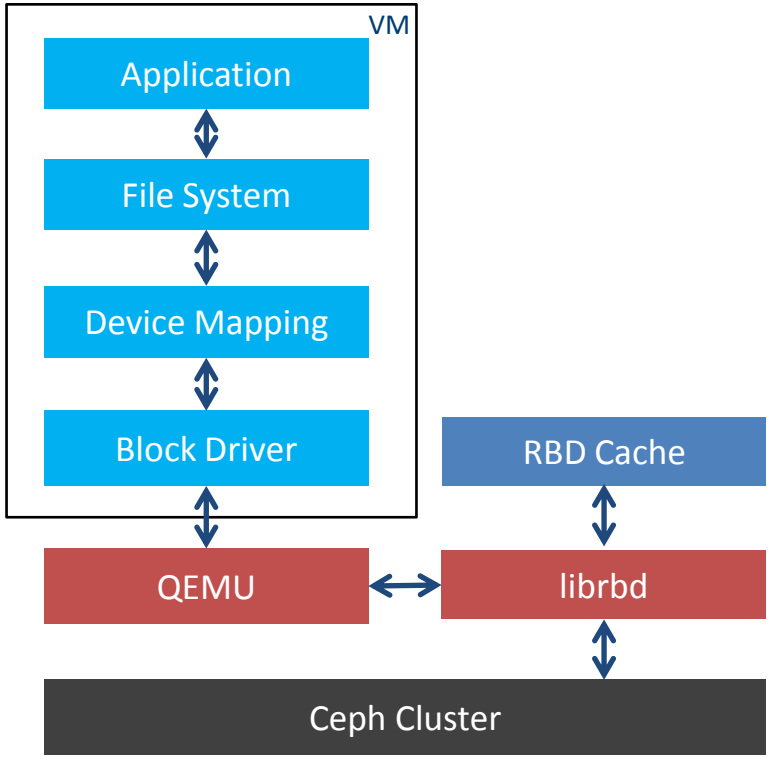


Multi-level Cache

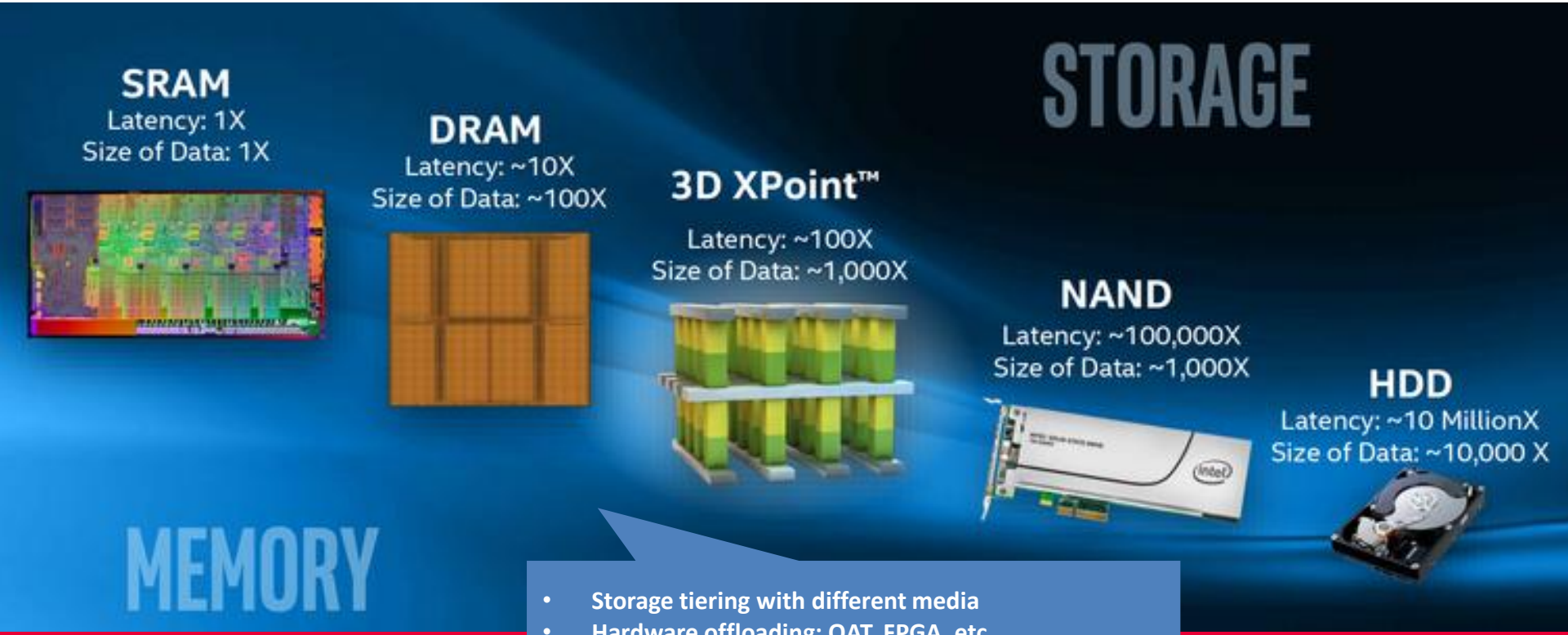


Client Side Cache

- RBD cache
  - Based on NVML library (http://pmem.io/)



Optimization with Intel Technologies

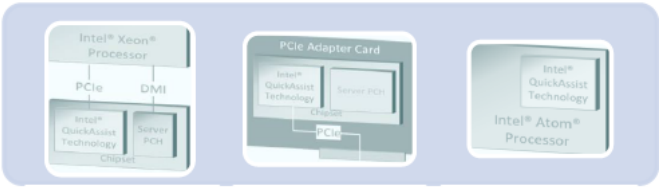


- Storage tiering with different media
- Hardware offloading: QAT, FPGA, etc.
- Software integration: DPDK, SPDK, ISA-L, etc.

Pass-through to VM with full performance

Hardware-based Acceleration with Intel QAT

Bulk Cryptography	• Security (symmetric encryption and authentication) for data in flight and at rest
Public Key Cryptography	• Secure Key Establishment (asymmetric encryption, digital signatures, key exchange)
Compression	• Lossless data compression for data in flight and at rest



Chipset	PCI Express* Plugin Card	SoC
Connects to CPU via on-board PCI Express* lanes		Connects to CPU via on-chip interconnect

Open-source Software Support

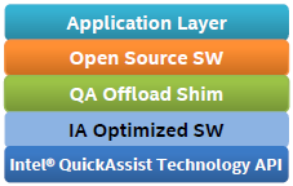
Cryptography	OpenSSL libcrypto, Linux kernel crypto API (scatterlist)
Data Compression	zlib (user API), BTRFS/ZFS (kernel)

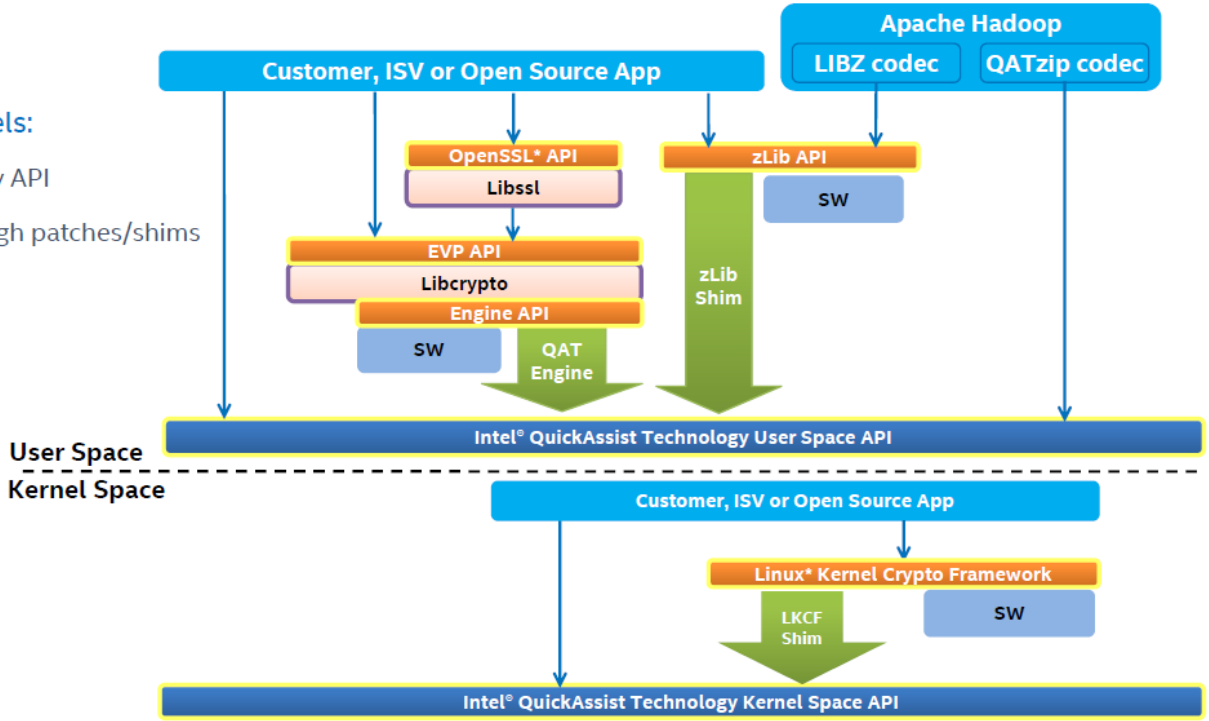
Hardware acceleration of compute intensive workloads (cryptography and compression)

QAT Software Stack

Application may integrate at multiple levels:

1. Program to Intel® QuickAssist Technology API
2. Program to open source framework through patches/shims





Contd..

- Data compression offers improved storage efficiency
- Data compression is CPU intensive, getting better compression ratio requires more CPU cost
- Software and hardware offloads methods available for acceleration compression, including ISA-L, QAT and FPGA
- Hardware offloading method can greatly reduce CPU cost, optimize disk utilization & IO in Storage infrastructure

Community Building Status

THANK YOU